

COMPUTER CHASSIS

BACKGROUND

[0001] In the development of computer systems, the increased use of modular components has allowed for increased efficiency in adding and removing components to and from the system. This increased efficiency has contributed to an added emphasis on the simplification of assembly, maintenance, and upgradability. Computer system chassis are designed to provide mounting locations for the operating components of the computer system. Once the size and configuration of a chassis is established it is often difficult to effectuate changes to the design and layout of the chassis.

[0002] The limitations of a particular chassis configuration are often most evident when an upgrade to the computer system is desired and, although a selected component may be able to interface with the computer system, the chassis potentially limits the upgrades available. This most often results in the development and construction of a new chassis to accommodate the desired upgrade. Therefore, as can be appreciated, there is a need for a computer chassis that is easily adaptable for use with a variety of modular components.

SUMMARY

[0003] The problems noted above are solved in large part by an adaptable computer chassis. One of the exemplary embodiments may comprise a chassis base and first and second drawers removably engaged with the chassis base. An interface board is mounted to the first drawer so as to couple to a first electrical component when the first electrical component is located in the first drawer. The second drawer has a connector mounted so as to couple to a second electrical component when the second electrical component is located in

the second drawer. The connector engages the interface board so as to couple the first electrical component to the second electrical component when the first and second electrical components are located in the respective first and second drawers.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] For a detailed description of exemplary embodiments of the invention, reference will now be made to the accompanying drawings in which:

[0005] Figure 1 illustrates a front perspective view of a computer chassis in accordance with embodiments of the invention;

[0006] Figure 2 illustrates a front perspective view of a front drawer in accordance with embodiments of the invention;

[0007] Figure 3 illustrates a front perspective view of a rear drawer in accordance with embodiments of the invention;

[0008] Figure 4 illustrates a schematic view of the electrical coupling of the components in accordance with embodiments of the invention;

[0009] Figure 5 illustrates a top perspective view of the assembly of the computer chassis in accordance with embodiments of the invention; and

[0010] Figure 6 illustrates an isometric view of a midplane board in accordance with embodiments of the invention.

DETAILED DESCRIPTION

[0011] Certain terms are used throughout the following description and claims to refer to particular system components. As one skilled in the art will appreciate, computer companies may refer to a component by different names. This document does not intend to distinguish between components that differ in name but not function. In the following discussion and in the claims, the terms “including” and “comprising” are used in an open-ended fashion, and thus should be interpreted to mean “including, but not limited to ...” Also, the term “couple” or “couples” is intended to mean either an indirect or direct electrical connection. Thus, if a first device couples to a second device, that connection may be through a direct electrical connection, or through an indirect electrical connection via other devices and connections.

[0012] The following discussion is directed to various embodiments of the invention. Although one or more of these embodiments may be preferred, the embodiments disclosed should not be interpreted, or otherwise used, as limiting the scope of the disclosure. In addition, one skilled in the art will understand that the following description has broad application, and the discussion of any embodiment is meant only to be exemplary of that embodiment, and not intended to intimate that the scope of the disclosure is limited to that embodiment.

[0013] Referring now to Figure 1, a computer chassis 10 is configured as a rack mounted server chassis. Chassis 10 comprises chassis base 20 having front 22 and sides 24 comprising rack rail interfaces 26. Chassis base 20 is configured to accept a front drawer 28 and a rear drawer 30, which are inserted laterally into the base, and are configured to hold various modular computer components. Chassis base 20 may also include a top (not shown) that can be moveably or detachably connected to the base and, when installed, covers the tops of front drawer 28 and rear drawer 30.

[0014] In the embodiments shown, front drawer 28 comprises a power supply bay 32, hard drive bay 34, and media module bay 36. The modular components mounted in front drawer 28 couple to a mid-plane board 46 mounted at the rear 48 of the front drawer. Rear drawer 30 comprises expansion card bay 38, processor bay 40, cooling system bay 42, and memory bay 44. The modular components mounted in rear drawer 30 couple to a motherboard (not shown) installed in the bottom of the rear drawer. The motherboard comprises a connector that interfaces with the mid-plane board 46 to couple the components of front drawer 28 and rear drawer 30.

[0015] Referring now to Figure 2, embodiments of a front drawer 28 are shown comprising power supply bay 32, hard drive bay 34, and media module bay 36. Both sides 49 of front drawer 28 also include rails 50, springs 52, latches 54, and thumbscrews 56. These components act to locate and secure the drawer within chassis base 20. Rails 50 are configured to interface with chassis base 20 and control the vertical position of the front drawer. Springs 52, latches 54, and thumbscrews 56 secure front drawer 28 to chassis base 20.

[0016] Referring now to Figure 3, embodiments of a rear drawer 30 are shown comprising expansion card bay 38, processor bay 40, cooling system bay 42, and memory bay 44. Both sides 57 of rear drawer 30 also include rails 58 to located the drawer vertically and latches 60 to lock the drawer onto chassis base 20. Rear drawer 30 is configured to have sufficient positional variation relative to chassis base 20 in order to properly align with and engage front drawer 28.

[0017] Referring now to Figure 4, a schematic illustration of the electrical coupling of front drawer 28 and rear drawer 30 is shown. Front drawer 28 supports midplane board 46, which is coupled to modular component 60 by connector 62. Rear drawer 30 supports motherboard 68, which is coupled to modular component 66 by connector 70. Connector 64 couples midplane board 46 to motherboard 68. Midplane board 46 provides the interface between all of the modules and power supplies within chassis 10. Thus, all of the components housed in both the front drawer 28 and rear drawer 30 are coupled by various connectors, which eliminate complex wiring and allow for simple modularized replacement of components.

[0018] Assembly of modular components into front drawer 28 may be performed before the drawer is installed in chassis base 20. For example, a power supply module can be installed in bay 32, one or more hard drives can be installed into bay 34, and a disc drive can be installed into media module bay 36. These components are installed by sliding the components into the selected bay and engaging a connector mounted on the rear of the component with a complimentary connector on the front of mid-plane board 46.

[0019] Assembly of modular component into rear drawer 30 may also be performed with the drawer not installed in chassis base 20. For example, one of more expansion cards can be installed into expansion card bay 38, multiple processors and heat sinks can be installed in processor bay 40, fans can be installed in cooling system bay 42, and memory modules can be installed in memory bay 44. These components are installed by vertically inserting the components into the appropriate bay and engaging a connector mounted to a motherboard at the base of rear drawer 30.

[0020] Referring now to Figure 5, front drawer 28 is slid into chassis base 20 from front 22 until fully engaged. Rails 50 on front drawer 28 engage rails 72 on chassis base 20, which support the weight of the front drawer and its components. Chassis base 20 may also include a pin 74, which engages a slot (not shown) on the base of front drawer 28 and controls the lateral position of the drawer. Once front drawer 28 is fully engaged, springs 52 and latches 54 engage chassis base 20. Thumbscrews 56 can also be engaged to further secure front drawer 28 to the base.

[0021] Once front drawer 28 is secured to chassis base 20, rear drawer 30 can be installed. Rails 58 on rear drawer 30 engage rails 76 on chassis base 20, which support the weight of the rear drawer and its components. As rear drawer 30 is slid toward front drawer 28, the connectors on the mid-plane board and the motherboard engage. Latches 60 can then be used to secure rear drawer 30 to chassis base 20.

[0022] Thus, none of the critical components of the system are permanently affixed to chassis base 20. This allows for the modules to be upgraded without changing the chassis design or even removing the chassis base from the storage rack. Therefore, upgrading is greatly simplified and can be performed at lower costs and without redesign or modification of the chassis.

[0023] Referring now to Figure 6, there are illustrated exemplary embodiments of a midplane board 46. Midplane board 46 comprises front connectors 78, 79, and 80 and rear connector 82. Midplane board 46 is mounted to front drawer 28 with mounting screws or other securing methods. Connector 78 is in alignment with power supply bay 32 and engages the module installed in that bay. Connector 80 is in alignment with hard drive bay 32 and engages the modules installed in that bay. Connector 82 is in alignment with media module bay 36 and engages the module installed in that bay. Rear connector 82 is aligned with a complementary connector on rear drawer 30 when the rear drawer is inserted into chassis base 20. This permits the components mounted in rear drawer 30 to be plugged directly into midplane board 46.

[0024] Midplane board 46 is used to directly interconnect all of the modules and their associated components and the power supplies with direct connectors and

without any ribbon signal and power cables. The direct connectors facilitate easy assembly and disassembly of the modules from chassis 10, and further permit easy hot-swappability of the power supplies. By not utilizing any ribbon signal and power cables to interconnect the modules and power supplies, a small form factor can be maintained for chassis 10, thereby saving valuable rack mounting space of the chassis 10. By also allowing for easy assembly and disassembly of the modules, the amount of down time for the computer is minimized for repair and/or upgrades of the modules.

[0025] The above discussion is meant to be illustrative of the principles and various embodiments of the present invention. Numerous variations and modifications will become apparent to those skilled in the art once the above disclosure is fully appreciated. For example, the drawers can support a different number or configuration of modular components or a system may employ more than two drawers. Similarly, the arrangement and configuration of the interface between the drawers and the chassis base can be embodied in many different forms. It is intended that the following claims be interpreted to embrace all such variations and modifications.